



## PERFECT TRACKING CONTROL WITH DISCRETE-TIME LQR FOR A NON-MINIMUM PHASE ELECTRO- HYDRAULIC ACTUATOR SYSTEM

<sup>1</sup>R. Ghazali, <sup>1</sup>Y. M. Sam, <sup>1</sup>M. F. Rahmat, <sup>1</sup>Zulfatman, <sup>2</sup>A. W. I. M. Hashim

<sup>1</sup>Department of Control and Instrumentation, Faculty of Electrical Engineering,

Universiti Teknologi Malaysia, 81310 Skudai, Malaysia

<sup>2</sup>College of Science and Technology, International Campus,

Universiti Teknologi Malaysia, 51400 Kuala Lumpur, Malaysia

Emails: [yahaya@fke.utm.my](mailto:yahaya@fke.utm.my), [rozaimi@ieee.org](mailto:rozaimi@ieee.org), [fuaad@fke.utm.my](mailto:fuaad@fke.utm.my)

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*Abstract- This paper presents a perfect tracking control for discrete-time nonminimum phase of electro-hydraulic servo (EHS) system by adopting a combination of feedback and feedforward controller. A linear-quadratic-regulator (LQR) is firstly design as a feedback controller and a feedforward controller is then proposed to eliminate the phase error emerge by the LQR controller during the tracking control. The feedforward controller is develop by implementing the zero phase error tracking control (ZPETC) technique which the main difficulty arises from the non-minimum phase system is have no stable inverse. Subsequently, the controller is applied to EHS system which is represented in discrete-time model where the model is obtained experimentally using system identification method. The proposed controller design using ZPETC is particularly suited to the*

*various positioning control applications that encounter non-minimum phase problem. It is also shows that the controller offers good performance in reducing phase and gain error that typically occur in positioning or tracking systems.*

**Index terms:** Nonminimum phase system, linear quadratic control, zero phase error tracking control, electro hydraulic actuator system, perfect tracking control